

UNITED STATES MARINE CORPS
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STUDENT HANDOUT

REPAIR FLOODLIGHT SET ELECTRICAL SYSTEM

1. **Terminal Learning Objective:** Given a schematic of a floodlight tower with a faulty electrical system and a description of the symptoms, with the aid of references, identify the probable cause of the malfunction in accordance with the appropriate equipment technical manual. (1142.01.02)

2. **Enabling Learning Objectives:**

(1) Without the aid of references, given the necessary equipment, tools and materials identify a malfunctioning control panel in accordance with the appropriate technical manual. (1142.01.02a)

(2) Without the aid of references, given the necessary equipment, tools and materials identify the proper function of a floodlight circuit in accordance with the appropriate technical manual. (1142.01.02b)

BODY

1. **Electrical/Mechanical Controls And Components.**

a. BT, Battery. This is a 12 volt DC battery used specifically to operate the beacon lamp, when the generator is not powering the battery charger.

b. L1, L2, L3, Lamp Ballast. The lamp ballast's are basically nothing more than step-up transformers that will take the input 120 volts AC and step it up to approximately 400 volts AC. This high voltage is needed in order for the various types of gas to be vaporized, to give off light.

c. DS1, DS2, DS3, High Intensity Discharge Lamps (HID). The main source of light is produced by these 1000 Watt (HID) metal halide vapor lamps. The internal quartz glass tube contains argon gas, mercury, thorium iodide, sodium iodide, scandium iodide. It is these iodides that produce the light.

d. DS4, Beacon Lamp. This is a 12 volt DC lamp used as a warning device whenever the floodlight tower is extended into its raised position.

e. DS5, DS6, DS7, DS8, Auxiliary Lamps. An auxiliary source of light is available from four incandescent 500 watt flood lamps. The internal circuitry of each lamp is protected by a quartz glass tube. The tube contains a tungsten filament and bromide or iodine.

f. CB1, Main Circuit Breaker. This 30 amp circuit breaker controls both the AC and DC systems of the floodlight set by supplying voltage to the control panel from the generator set.

g. CB2, CB3, CB4, (HID) Lamp Circuit Breaker. These 15 amp circuit breakers control the output to each of the 1000 watt lamps.

h. CB5, Battery Charger Circuit Breaker. This 2 amp circuit breaker protects the battery charger circuit from overload.

i. CB6, CB7, Convenience Receptacle Circuit Breaker. These 15 amp circuit breakers not only controls the Convenience Receptacle but also protects it from short circuits.

j. CB8, CB9, CB10, CB11, Auxiliary Lamp Circuit Breakers. These 15 amp circuit breakers not only control the 500 watt lamps they also protect them from short circuits.

k. S, Beacon Switch. This single pole, single throw switch connects the beacon lamp with the 12 volt DC potential to illuminate the beacon light.

2. Floodlight Circuits.

a. Neutral Potential (Dark Green). Neutral potential will be placed on TB3 from the generator load terminal L0. This neutral is also electrically connected to the earth ground. TB3 is also electrically connected to ground.

b. Hot Phase Potential (Dark Blue).

(1) Hot potential will be placed on the main circuit breaker (CB1) from terminals L1 and L3 of the generator set. Since CB1 is open this potential will just be felt there.

(2) Potential will also be felt at the normally closed battery charger circuit breaker and onto the battery charger.

c. Battery Charger Potential (Purple). 12 volt DC potential will now be felt through wire P19A14 onto TB1, at TB1 the potential will be felt at the normally open beacon switch.

d. CB1 energized (Red).

(1) When CB1 is closed potential can now be felt at the open breakers CB8, CB9, CB10 and CB11.

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(2) Potential will also be placed on the open circuit breakers CB2, CB3 and CB4.

(3) Potential will also be placed on the open circuit breakers CB6 and CB7.

e. Auxiliary Lamps Illuminated (Orange). Upon energizing or (closing) circuit breakers CB8,9,10 or 11 they will supply the potential to DS5,6,7 or 8 throw the black wire.

f. Convenience Receptacle Energized (Brown). Energizing CB6 or CB7 will allow potential to be felt at the convenience receptacles J1-1 and J1-2.

g. (HID) Circuit Breakers Energized (Yellow). Energizing CB2, CB3 or CB4 will allow potential to be felt on the lamp ballast's L1, L2 or L3 respectively.

h. (HID) Lamps Illuminated (Light Green). When the ballast's step up the voltage to approximately 400 volts the potential will be placed on the TB1 and then be felt on its respective jack and then onto the HID lamp.

REFERENCES: TM-05684C-12
TM-08857A-14/1
TM-4700-15/1